MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

MODULE TEST #1

TRIMESTER 1, 2020 / 2021

ECE3296 – DIGITAL IMAGE AND VIDEO PROCESSING

(CE)

1 OCTOBER 2020
8.30 p.m. - 9.30 p.m.
(1 Hour)

INSTRUCTIONS TO STUDENT

1. This question paper consists of **2** printed pages with **FOUR** questions only.
2. Answer **ALL** questions.
3. Write your answers in the Answer Booklet.

(1) Medical imaging is one of the many examples of image processing applications. Identify four (4) different types of modalities used in medical images, and specify the sources of energy used to generate them.

[8 marks]

(2) Explain the different stages of image processing below, and suggest the levels of image processing involved for each stage.

- Pre-processing
- Segmentation
- Representation and description
- Recognition and interpretation

[12 marks]

(3) Geometrical image transformation can be represented by a 3×3 affine matrix T, given in the equation below:

$$\begin{bmatrix} x' \\ y' \\ 1 \end{bmatrix} = T \begin{bmatrix} x \\ y \\ 1 \end{bmatrix}$$

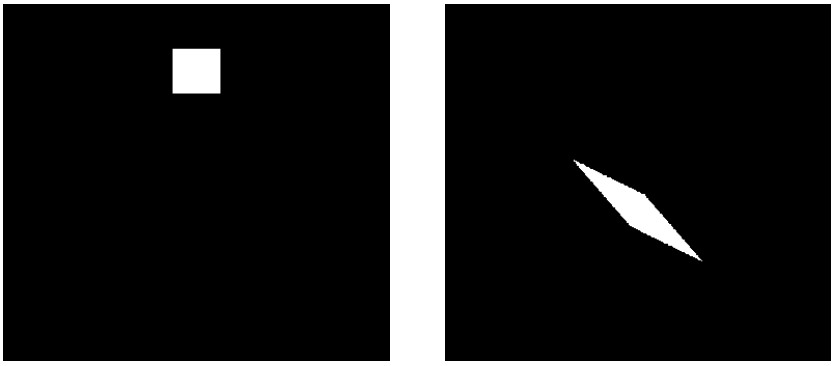
Deduce all transformations involved in the following matrices T:

(i) $T = \begin{bmatrix} 1 & 0 & -50 \\ 0 & 1 & 80 \\ 0 & 0 & 1 \end{bmatrix}$ [2 marks]

(ii) $T = \begin{bmatrix} 0.5cos60° & -0.5sin60° & 0 \\ 0.5sin60° & 0.5cos60° & 0 \\ 0 & 0 & 1 \end{bmatrix}$ [2 marks]

(iii) $T = \begin{bmatrix} 1 & 0.75 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ [2 marks]

(4) Suggest all the geometrical operations involved in transforming the binary image in Figure 1(a) to the one in Figure 1(b). Justify your answer.



(a) (b)

Figure 1

[4 marks]

End of Paper